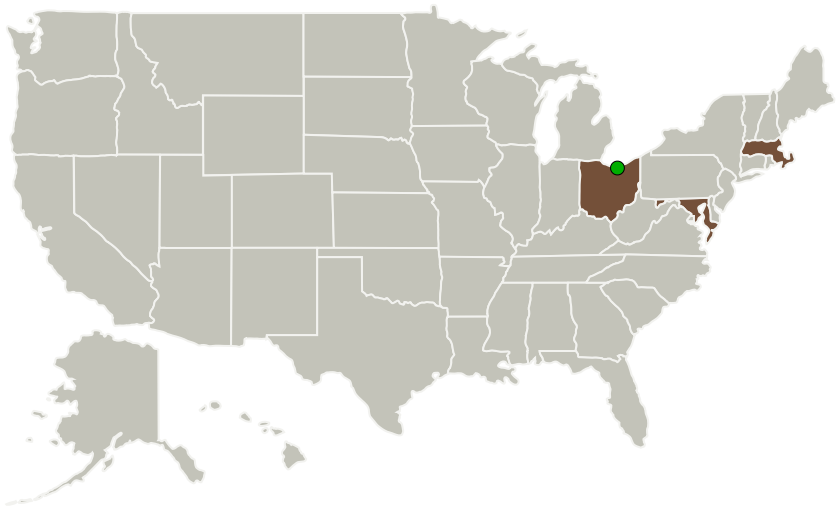
Superconducting Resonant Inductive Power Coupling, Phase I

Completed Technology Project (2011 - 2012)

Project Introduction

The proposed effort will develop a technology to wirelessly and efficiently transfer power over hundreds of meters via resonant inductive coupling. The key innovation of this approach is the use of dielectricless high-temperature superconducting (HTS) coils to overcome the limitations in efficiency and range of existing solutions. This approach is informed by existing research models that predict a nominal application of this technique is capable of delivering 100 Watts of power at a distance of 100 meters with over 90% efficiency. A notional application of the technology is to deliver power to rovers exploring the inside of craters at the Lunar poles, where solar power is not available. The naturally low temperatures would eliminate the need for thermal control overhead on the rover, allowing the system to be charged from a completely unenergized state or powered directly. Multiple rovers could be powered by the same transmission system and there would be no pointing requirements for operation. The phase I effort will demonstrate efficient wireless power transfer using superconducting wires as a proof of concept (TRL 3-4), which will be integrated with existing thermal control technology (TRL 4) into a working prototype (TRL 6) at the end of Phase II.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Axis Engineering Technologies	Lead Organization	Industry	Cambridge, Massachusetts
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio
University of Maryland-College Park(UMCP)	Supporting Organization	Academia	College Park, Maryland

Primary U.S. Work Locations	
Maryland	Massachusetts
Ohio	

Project Transitions

February 2011: Project Start

February 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137345)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Axis Engineering Technologies

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

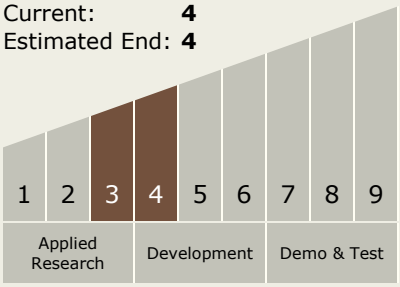
Carlos Torrez

Principal Investigator:

Raymond Sedwick

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.1 Cryogenic Systems
    - TX14.1.3 Thermal Conditioning for Sensors, Instruments, and High Efficiency Electric Motors

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System